

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-71 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Allowable Subject Matter

It is gratefully acknowledged that the Examiner considers the subject matter of claims 5, 7, 9, 38-40 and 71 as being allowable if re-written in independent form. Applicants have not yet rewritten these claims in independent form since they believe that the independent claims from which they depend are also allowable.

References

The Examiner has relied on the patent of Sverdrup, as well as other references. It is noted that this reference was not cited on the PTO-892 form. It is understood that this refers to US Patent 2,800,462. The Examiner is requested to properly cite this reference in the next action.

Rejection Under 35 USC 102

Claims 1, 2, 4, 6, 8 10, 11, 16, 17, 53-55, 57-63 and 65-68 stand rejected under 35 USC 102 as being anticipated by Sverdrup (US Patent 2,800,462). This rejection is respectfully traversed.

The Examiner states that the reference shows methods of reclaiming rubber including mixing scrap rubber with reclaiming oils with heat followed by cooling. The mixing step is taught as generating the heat and involving shear forces. Applicants disagree with the Examiner's application of this reference against the claims.

The Sverdrup process consists of taking crumb rubber at a specific mesh size and passing it through a conveyor mixer. To this a powder is added which is preheated between 450-750°F (232-399°C). The heated powders are combined with the crumb rubber (which may include an

oil and a mixer). However, the range of temperatures used by Sverdrup are above the point of devulcanization and degradation of the rubber.

In the present invention, scrap elastomer is introduced into a vessel, agitated and then heated to a temperature below a temperature where the elastomer begins to degrade. Oil is admixed with the scrap after which the mass is cooled. Devulcanization of the scrap occurs in the present invention but the polymer does not degrade because the temperature is maintained at all times below 200°C. Further, no ingredients such as the whiting powder need be added beyond the scrap elastomer and the oil.

In the reference, the crumb rubber is heated above the temperature of degradation in a range from 300-350°F (150-232°C) by the addition of the preheated powder to the elastomer. Applicants submit that any crumb rubber which comes directly into contact with the preheated powder at its minimum temperature of 450°F (232°C) would lead to localized degradation of the crumb rubber, and at the maximum temperature of 750°F (399°C) of the powder would undeniably degrade the rubber. This mixing of the hot powder and crumb rubber causes the devulcanization and degradation of the crumb rubber to occur. Therefore, Sverdrup neither teaches nor suggests the present invention.

In particular, it is noted that claim 1, step c specifically states that the elastomer is heated to a temperature below a temperature where elastomer begins to degrade. A similar step occurs in claim 20, step b. Claims 53 and 61 are similar to claims 1 and 20, respectively in this regard. Thus, Applicants submit that Sverdrup does not anticipate any of the independent claims since this feature is lacking from the reference. Accordingly, Applicants submit that these claims are allowable.

Claims 1-4 and 6, 8, 10, 11, 14-17 and 53-68 stand rejected under 35 USC 102 as being anticipated by Fisher et al. (US Patent 5,883,140). This rejection is respectfully traversed.

The Examiner states that Fisher et al. shows a method for reclaiming scrap rubber including the addition of oil in amounts up to 5% and the use of blenders to impart shear forces and generate heat. This includes the generation of temperatures of 190-320°C.

In the Fisher et al. process, reclaimed rubber is subjected to mechanical working applying highly intensive impact forces. While various chemical can be added, it is also possible to operate the process without the addition of any added chemicals. As indicated at column 4, line 16 and following, the temperature of the mass will rise to at least 190°C and not above 320°C. Applicants submit that the temperature range suggested by Fisher is substantially greater than that taught by the present invention and would cause degradation of the polymer.

The present invention teaches a method where oil is included and the working of the scrap occurs at a low temperature between a range of 50-200°C and more preferably between 160-190°C. Applicants submit that Fisher et al. does not teach this concept. In particular, Fisher does not understand that the temperature must remain below the temperature of degradation of the scrap rubber and produce a rubber that is different and inferior with respect to tensile strength and elongation percentage.

As noted above, the independent claims include a recitation that the elastomer is heated to a temperature below a temperature where the elastomer begins to degrade. This occurs in claim 1, step c; claim 20, step b; claim 53, step c and claim 61, step b. Applicants submit that Fisher et al. does not limit the temperature to this range and accordingly these claims are considered to be allowable. In addition, Fisher et al. does not require the addition of oil as does the present invention. In example 3, Fisher teaches the inclusion of an aromatic oil however Fisher et al. does not realize the advantages gained by the inclusion of oils with the limit of heating.

Applicants also wish to point out the process of Fisher et al. produces a different product than that of the present invention. This is seen in compound number 4 of the present application where a rubber product is produced with 100% scrap rubber content produced by the process of the present invention. The properties of compound number 4, when produced at temperature of 200°C are tensile strength of 1678.5psi and elongation percentage of 456.6. These properties clearly are different and superior to those produced by Fisher et al.

Rejection under 35 USC 103

Claims 12, 13, 18-37 and 41-52 stand rejected under 35 USC 103 as being obvious over Fisher et al. This rejection is respectfully traversed.

The Examiner admits that Fisher et al. fails to explicitly recite a separate oil addition step, process times, rotation rates and specific oils as recited in these claims. The Examiner feels that it would have been obvious to add oil at any convenient point in the process, that the rotation rates would be obvious and the specific oils are well known. Applicants submit that even if the Examiner is correct in regard to these dependent claims, these claim remain allowable based on their dependency from allowable independent claims 1 and 20.

Claims 69 and 70 stand rejected under 35 USC 103 as being obvious over Fisher et al. in view of Mukai et al. (US Patent 6, 037,418). This rejection is respectfully traversed.

The Examiner points out that Mukai et al. teaches the use of regenerated rubber for automotive applications such as hoses. However, Applicants submit that even if this reference does teach this feature, these claims remain allowable based on their dependency from allowable independent claims.

Conclusion

In view of the remarks, it is believed that claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejections and allowance of all the claims are respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert F. Gnuse Reg. No. 27,295 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

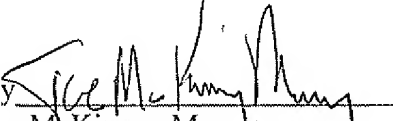
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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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